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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/975,257
Filing Date: October 12, 2001
Appellant(s): NARAYANAN ET AL.

Brian K. Lathrop
Registration No. 43,740
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/10/2006 appealing from the Office action mailed 4/11/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,372,581	Bensahel et al.	4-2002
5,862,054	Li	1-1999
JP 2000-311928	Yasushi	11-2000

Wolf et al., Silicon Processing for the VLSI Era, Vol. 1-3 Lattice Press, California (1990, 2000), pp. 309-310 (vol. 1), 397-398 (vol. 2).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3, 5-12, 17, and 18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yasushi (JP 2000-311928, published 11/7/2000) in view of Bensahel et al. (U.S. 6,372,581).

Regarding claim 1, Yasushi teaches a method of determining the nitrogen content of a nitrided gate oxide layer on a semiconductor substrate comprising:

nitriding a gate oxide layer (**2**) on a semiconductor substrate (**1**) to form the nitrided gate oxide layer (**3**) on the substrate;

oxidizing the nitrided gate oxide layer on the substrate, wherein the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate (Yasushi does not expressly teach this effect, but since Yasushi teaches reoxidizing the nitrided gate manner by heating the sample in an oxygen atmosphere—page 2, lines 6-8 of the translation—the same method disclosed by Appellant, it is inherent that the step of oxidizing the nitrided gate oxide layer taught by Yasushi will also distance the nitrided gate oxide layer away from the semiconductor substrate);

measuring the thickness (L2) of the oxidized nitrided gate oxide layer (**4**);

optionally calculating the change in thickness of the oxidized nitrided gate oxide layer; and

determining if the measured thickness or calculated change in thickness of the oxidized nitrided gate oxide layer exceeds a target thickness (40 Å—Fig. 1 and 2, abstract, and pg. 2 of translation).

Yasushi does not teach using nitric oxide (NO) to nitride the gate oxide layer.

Bensahel et al. teaches that it is known in the art to substitute NO for N_2O to nitride a gate oxide layer because N_20 is ineffective for nitriding thin oxide layers (column 1, lines 35-40).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and substitute NO for N_2O to nitride the gate oxide layer because it is known in the art to use either NO or N_2O for this purpose, and furthermore, N_2O is ineffective for nitriding thin oxide layers, as expressly taught by Bensahel et al.

Regarding claim 3, Yasushi and Bensahel et al. together teach the method of claim 1. Yasushi further teaches correlating the measured thickness or change in thickness of the oxidized nitrided gate oxide layer with the nitrogen content of the gate oxide layer (abstract and pg. 2 of translation).

Regarding claim 5, Yasushi and Bensahel et al. together teach the method of claim 1. Yasushi further teaches forming the gate oxide layer on the substrate prior to the nitriding step (Fig. 1, pg. 2).

Regarding claim 6, Yasushi and Bensahel et al. together teach the method of claim 3. Yasushi further teaches that the correlating step comprises measuring the oxidized nitrided gate oxide for a plurality of samples, each having a known nitrogen

content; optionally calculating the change in thickness after oxidizing the nitrided gate oxide layer for each sample; and performing a least-squares regression analysis to generate a calibration curve for nitrogen content of the nitrided gate oxide as a function of oxidized nitrided gate oxide thickness or change in oxidized nitrided gate oxide thickness (see Fig. 2 and pg. 2).

Regarding claim 7, Yasushi and Bensahel et al. together teach the method of claim 1. Yasushi further teaches that the step of determining the change in thickness of the oxidized nitrided gate oxide layer comprises determining an initial gate oxide thickness by measuring the thickness of the gate oxide layer prior to the oxidation step (L1) and calculating the difference between the measured oxidized nitrided gate oxide layer thickness and the initial gate oxide thickness (pg. 2—[(L2-L1)/T]).

Regarding claim 9, Yasushi and Bensahel et al. together teach the method of claim 7. Yasushi further teaches measuring the initial gate oxide thickness after the nitridation step (L1—pg. 2).

Regarding claim 10, Yasushi teaches a method of determining the nitrogen content of a nitrided gate oxide layer on a semiconductor substrate comprising:

nitriding a gate oxide layer (**2**) on a semiconductor substrate (**1**) to form the nitrided gate oxide layer (**3**) on the substrate;

oxidizing the nitrided gate oxide layer on the substrate wherein the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate (Yasushi does not expressly teach this effect, but since Yasushi teaches reoxidizing the nitrided gate manner by heating the sample in an

oxygen atmosphere—page 2, lines 6-8 of the translation—the same method disclosed by Appellant, it is inherent that the step of oxidizing the nitrided gate oxide layer taught by Yasushi will also distance the nitrided gate oxide layer away from the semiconductor substrate);

measuring the thickness (L2) of the oxidized nitrided gate oxide layer (**4**);

calculating the change in thickness of the oxidized nitrided gate oxide layer; and

determining if the measured thickness or calculated change in thickness of the oxidized nitrided gate oxide layer exceeds a target thickness value (40 Å), wherein calculating the change in thickness of the oxidized nitrided gate oxide layer comprises determining an initial gate oxide thickness (measuring L1) prior to the oxidation step and calculating the difference between the measured oxidized nitrided gate oxide layer thickness and the initial gate oxide thickness ([(L2-L1)/T]; Fig. 1 and 2, abstract, and pg. 2 of translation).

Yasushi does not teach using nitric oxide (NO) to nitride the gate oxide layer.

Bensahel et al. teaches that it is known in the art to substitute NO for N_2O to nitride a gate oxide layer because N_20 is ineffective for nitriding thin oxide layers (column 1, lines 35-40).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and substitute NO for N_2O to nitride the gate oxide layer because it is known in the art to use either NO or N_2O for this purpose, and furthermore, N_2O is ineffective for nitriding thin oxide layers, as expressly taught by Bensahel et al.

Regarding claim 12, Yasushi and Bensahel et al. together teach the method of claim 1. Yasushi further teaches measuring the concentration of nitrogen in a gate oxide layer (abstract and pg. 2). Although Yasushi does not explicitly teach forming the gate electrode layer, the Examiner deems this step inherent to the disclosure of Yasushi, since the scope of Yasushi's teaching entails a method for measuring the nitrogen concentration specifically in a gate oxide film (see MPEP 2112).

Regarding claim 8, Yasushi and Bensahel et al. together teach the method of claim 7, but do not teach measuring the initial gate oxide thickness before the nitridation step.

However, the instant specification contains no disclosure of either the critical nature of the claimed process (measuring the gate oxide thickness before the nitridation step), or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990).

In light of Appellant's failure to establish criticality, the limitation of measuring the gate oxide thickness before the nitridation step is deemed equivalent to the limitation of measuring the gate oxide thickness after the nitridation step.

Regarding claim 11, Yasushi and Bensahel et al. together teach the method of claim 10, but do not teach that the initial gate oxide thickness is estimated from previously collected gate oxide thickness data.

However, the instant specification contains no disclosure of either the critical nature of the claimed process (estimating the gate oxide thickness from previously collected gate oxide thickness data), or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990).

In light of Appellant's failure to establish criticality, the limitation of estimating the gate oxide thickness from previously collected gate oxide thickness data is deemed equivalent to estimating the gate oxide thickness via measurement.

Regarding claim 17, Yasushi and Bensahel et al. together teach the method of claim 1. Yasushi further teaches that the oxidizing step is performed in the same tool as the nitridation step (pg. 2).

Regarding claim 18, Yasushi and Bensahel et al. together teach the method of claim 1, but do not teach that the nitridation step is performed in a first tool and the substrate is transferred to a different tool for the oxidizing step.

However, the Examiner deems performing the oxidation and nitridation steps in the same chamber as equivalent to performing oxidation and nitridation in different tools, since the end results are the same.

Finally, the specification contains no disclosure of either the critical nature of the claimed process or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a

claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990).

Claim 2 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasushi (JP 2000-311928, published 11/7/2000) in view of Bensahel et al. (U.S. 6,372,581), as applied to claims 1 and 12 above, and further in view of Wolf et al. (*Silicon Processing for the VLSI Era*, vol. 1-3).

Regarding claim 2, Yasushi and Bensahel et al. together teach the method of claim 1 (note 35 U.S.C. 103(a) rejection above), but do not teach that the oxidizing step comprises rapid thermal oxidation of the nitrided gate oxide layer in a rapid thermal processing (RTP) chamber.

However, Wolf et al. teaches that RTP is emerging as the tool of choice for growth of ultra-thin gate oxides and oxynitrides (vol. 1, pg. 310). Furthermore, Wolf et al. teaches that RTP allows for reduced thermal budget and a short processing times at high temperatures (vol. 1, pg. 309).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and Bensahel et al. together, and also taught by claim 1, and further perform the oxidizing step by rapid thermal oxidation in an RTP chamber, which allows for reduced thermal budget, as expressly taught by Wolf et al.

Regarding claim 13, Yasushi and Bensahel et al. together teach the method of claim 12 (note 35 U.S.C. 103(a) rejection above), but they do not teach a step of implanting boron atoms in the gate electrode layer.

However, Wolf et al. teaches that it is known in the art to implant boron into a polysilicon gate electrode to make a p+ gate electrode, particularly with thin-oxide devices, to decrease punchthrough problems (vol. 3, pgs. 311-312).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and Bensahel et al. together, and also taught by claim 12, and further implant boron into the gate electrode to decrease punchthrough problems, as expressly taught by Wolf et al.

Regarding claim 14, Yasushi and Bensahel et al. together teach the method of claim 12, but do not teach that the predetermined value corresponds to a nitrogen content sufficient to prevent boron atoms from diffusing through the gate oxide layer and into the semiconductor substrate.

However, Wolf et al. teaches that a gate oxide subjected to nitridation with provide a barrier to boron migration (vol. 3, pgs. 313 and 649).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and Bensahel et al. together, and also taught by claim 12, and incorporate a gate oxide subjected to nitridation that will provide a barrier to boron migration, as taught by Wolf et al. to be well known in the art.

Regarding claims 15 and 16, Yasushi and Bensahel et al. together teach the method of claim 1, but do not teach that the oxidation step is conducted at a temperature of 900 to 1025 °C, or for 10 minutes or less.

However, Wolf et al. teaches reoxidation of a nitrided gate oxide layer at a temperature of 950 to 1150 °C for about 60 seconds (vol. 3, pgs. 653). Furthermore, Wolf et al. teaches that these are common process conditions for the reoxidation of a nitrided oxide layer.

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and Bensahel et al. together, and incorporate the reoxidation of a nitrided gate oxide layer at a temperature of 950 to 1150 °C for about 60 seconds, as taught by Wolf et al. to be process conditions commonly employed in the art to form a reoxidized nitrided gate oxide layer.

Claim 19 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Li (U.S. 5,862,054) in view of Yasushi (JP 2000-311928, published 11/7/2000) and Bensahel et al. (U.S. 6,372,581).

Regarding claim 19, Li teaches collecting process parameter data for each batch (**30**); storing parameter data in a database (**32**); computing an average value for each stored parameter (**32**); storing the average values in a historical data file on a computer (**33**); determining process control limits from the stored historical data file (**34**); and monitoring the process parameters and comparing these values to control limits (Fig. 3; column 4, lines 1-20). Li also inherently teaches that any of the above steps can be repeated to obtain necessary data for statistical process control.

Li does not teach for each substrate in a batch of semiconductor substrates, nitriding a gate oxide layer on the semiconductor substrate using nitric oxide gas to form the nitrided gate oxide layer on the substrate, and oxidizing the nitrided gate oxide layer

on the substrate to form an oxidized nitrided gate oxide layer, wherein the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate.

Yasushi teaches for each substrate in a batch of semiconductor substrates, nitriding a gate oxide layer on the semiconductor substrate to form the nitrided gate oxide layer on the substrate, oxidizing the nitrided gate oxide layer on the substrate to form an oxidized nitrided gate oxide layer, wherein the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate (Yasushi does not expressly teach this effect, but since Yasushi teaches reoxidizing the nitrided gate manner by heating the sample in an oxygen atmosphere—page 2, lines 6-8 of the translation—the same method disclosed by Appellant, it is inherent that the step of oxidizing the nitrided gate oxide layer taught by Yasushi will also distance the nitrided gate oxide layer away from the semiconductor substrate), and measuring the thickness of the oxidized nitrided gate oxide layer with a film thickness measuring device. Yasushi also teaches correlating the thickness of the reoxidized nitrided gate oxide layer with nitrogen concentration.

Yasushi does not teach using nitric oxide (NO) gas to form the nitrided gate oxide layer.

Bensa hel et al. teaches that it is known in the art to substitute NO for N_2O to nitride a gate oxide layer because N_20 is ineffective for nitriding thin oxide layers (column 1, lines 35-40).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Yasushi and substitute NO for N_2O to nitride the gate oxide layer because it is known in the art to use either NO or N_2O for this purpose, and furthermore, N_2O is ineffective for nitriding thin oxide layers, as expressly taught by Bensahel et al.

It would also have been obvious to one of ordinary skill in the art, at the time of the invention, to combine the teaching of Li with the combined teachings of Yasushi and Bensahel et al. by incorporating with the teachings of Li the steps of, for each substrate in a batch of semiconductor substrates, nitriding a gate oxide layer on the semiconductor substrate using nitric oxide gas to form the nitrided gate oxide layer on the substrate, and oxidizing the nitrided gate oxide layer on the substrate to form an oxidized nitrided gate oxide layer, and measuring the thickness of the oxidized nitrided gate oxide layer, in order to determine the nitrogen concentration in the gate oxide layer.

Claim 23 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Li (U.S. 5,862,054) in view of Yasushi (JP 2000-311928, published 11/7/2000) and Bensahel et al. (U.S. 6,372,581), as applied to claim 19 above, and further in view of Wolf et al. (*Silicon Processing for the VLSI Era*, vol. 1-3).

Regarding claim 23, Li, Yasushi, and Bensahel et al. together teach the method of claim 19 (note 35 U.S.C. 103(a) rejection above). Yasushi further teaches forming a gate electrode over the gate oxide layer (abstract, pg. 2—although Yasushi does not explicitly teach forming the gate electrode layer, the Examiner deems this step inherent

to the disclosure of Yasushi, since the scope of Yasushi's teaching entails a method for measuring the nitrogen concentration specifically in a gate oxide film (see MPEP 2112). They do not teach implanting boron atoms in the gate electrode layer.

However, Wolf et al. teaches that it is known in the art to implant boron into a polysilicon gate electrode to make a p+ gate electrode, particularly with thin-oxide devices, to decrease punchthrough problems (vol. 3, pgs. 311-312).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Li, Yasushi and Bensahel et al. together, and also taught by claim 19, and further form a gate electrode layer, taught by Yasushi, and implant boron into the gate electrode to decrease punchthrough problems, as expressly taught by Wolf et al.

(10) Response to Argument

A.

(1) Regarding the rejection of claims 1, 3, 5-12, 17, and 18 under 35 U.S.C. 103(a) as being obvious over Yasushi in view of Bensahel et al., Appellant argues that the examiner erroneously discounts teachings in Bensahel et al. and in the art of record that would have led one of ordinary skill in the art away from the claimed method (p. 9 of appeal brief).

Appellant further argues (p. 10) that Bensahel et al. does not motivate one to use NO gas in a method comprising oxidizing the nitrided gate oxide layer, and quotes a passage of Bensahel et al. that teaches that using NO gas for nitriding a gate oxide layer "does not allow the presence of nitrogen to be localized precisely at the interface between the substrate and the gate oxide layer (Si/SiO_2 interface)" (col. 1, ll. 42-25), and queries how an artisan might appreciate that the subsequent oxidation of the nitrided gate would distance the nitride layer from this interface.

However, in the passage quoted by Appellant, Bensahel is describing the limitations of prior-art methods of nitriding gate oxides using NO at high temperatures and pressures. Bensahel et al. teaches in column 1, lines 55-65 the inventive method of nitriding a gate oxide layer of a semiconductor device by

> treating the substrate coated with the native silicon oxide layer with nitric oxide (NO) gas at a temperature at most equal to 700°C and under a pressure at most equal to 10^4 Pa in order to obtain a gate oxide layer including nitrogen atoms principally located close to the substrate/gate oxide layer interface (column 1, ll. 60-65).

Additionally, Fig. 3 of Bensahel et al. shows that "the nitrogen inside the oxide layer is principally located close to the Si/SiO_2 interface" (column 3, ll. 6-7).

Therefore, when considered as a whole, Bensahel et al. does teach nitriding an oxidized layer using NO gas such that the nitrogen atoms congregate at the interface between the substrate and the gate oxide layer.

Appellant further argues that when Bensahel et al. reoxidizes the nitrided oxide layer, the nitrided layer remains next to the substrate and the oxidized layer accumulates on top of the nitrided gate oxide layer, and uses Fig. 1D of Bensahel et al. to illustrate this point.

However, this argument is not persuasive because Bensahel et al. does not expressly discuss the distance between the substrate and the nitrided layer. Bensahel et al. does teach that the nitrogen atoms are located principally close to the substrate/gate oxide layer interface before the reoxidation process, as discussed above. Bensahel et al. then teaches reoxidizing at a temperature of 850°C for five minutes (column 3, lines 1-5). Appellant teaches reoxidizing at a temperature of about 800°C to 1025°C for ten minutes or less (p. 9, last paragraph and p. 10, first paragraph of Appellant's specification; see also the example disclosed on p. 12). Since Bensahel et al. teaches reoxidizing under conditions within the ranges taught by Appellant, absence evidence to the contrary, it is reasonable to expect that under this particular set of conditions the two reoxidation processes would occur identically, and would thus yield the same result of the nitrided layer moving away from the substrate. Bensahel et al.'s not expressly addressing this effect does not mean that it does not occur.

Appellant next argues (p. 11) that Gusev teaches that there is a fundamental difference between the nidridation mechanisms of NO versus N_2O gases, and that the two gases would be expected to yield devices with different electrical properties. However, Appellant also admits that "Gusev does not teach whether the oxidation of a gate oxide layer nitrided with either NO or N_2O would have distanced the nitrided gate oxide layer from the substrate" (p. 11, lines 7-9). Therefore, Gusev does not teach that NO does not distance the nitrided gate oxide layer from the substrate, but rather, does not discuss the subject at all. Additionally, Appellant teaches in the instant specification (p. 9, lines 13-17) that either NO or N_2O can be used in the inventive process, and teaches no criticality that NO be used preferentially over N_2O. Therefore, it is not clear that the different electrical properties taught by Gusev that result from the use of the two different gases are relevant to the discussion of whether the reoxidation process distances the nitrided gate oxide from the substrate, since Appellant teaches that the two gases are interchangeable and will therefore yield comparable results.

Finally in this section, Appellant argues (bottom of p. 11 through p. 12) that the examiner cannot discount teachings in Bensahel et al. that would have taught away from the claimed method, since Bensahel et al. teaches that NO and N_2O yield different nitrogen profiles in the nitrided gate oxide layer. However, as explained above, the examiner does not believe that Bensahel et al. teaches away from the claimed method, and in fact does teach an accumulation of nitrogen at the Si/SiO_2 interface.

(2) Appellant argues (bottom of p. 12) that the rejection erroneously bases an obviousness rejection on an inherent characteristic of the cited art, and the rejection does not establish whether the allegedly inherent characteristic necessarily occurs.

It is the examiner's position that although Yasushi does not expressly teach that "the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate," as required by claim 1, the method taught by Yasushi does not differ from the method claimed by Appellant, so absence evidence to the contrary, it is clear that the two methods will have the same effect.

Moreover, as discussed above, Bensahel et al. discloses nitriding an oxide layer with NO gas and then reoxidizing under a set of conditions (gas, temperature, time of oxidation) that fall within the ranges taught by Appellant in their specification. So under these conditions, absent evidence to the contrary, it is clear that the nitriding process followed by reoxidation taught by Bensahel et al. will distance the nitrided layer from the substrate, just as it does in the process taught by Appellant. Bensahel et al. does not expressly indicate that this effect occurs, but also offers no evidence that it does not occur.

(3) Appellant argues (pp. 15-16) that the rejection erroneously requires Appellant to show that the chosen claim limitations are critical.

It is the examiner's position that the only difference between the method steps taught by Yasushi and those claimed by Appellant is that Yasushi uses N_2O gas to nitride the oxide layer, while Appellant uses NO gas. Additionally, Appellant teaches on p. 9, lines 13-17 of the instant specification that NO and N_2O are interchangeable in the

inventive process, and fails to teach even a preference between the two, much less the criticality of using NO.

Appellant additionally argues (first full paragraph of p. 16) that their specification includes a working example that "teaches the artisan how to practice the claimed method in compliance with 35 U.S.C. 112." It is exactly this working example that the examiner is comparing against the combined teachings of Yasushi and Bensahel et al. to arrive at the conclusion that under the conditions set forth in the example, and taught by Yasushi and Bensahel together, the same effect of distancing the nitrided layer from the substrate will occur. The examiner does not mean to suggest that the claims must stand in place of the specification, as indicated by Appellant in this section of the appeal brief, but only points out that the limitation "wherein the step of oxidizing the nitrided gate oxide layer distances the nitrided gate oxide layer away from the semiconductor substrate" is not a process step undertaken by an artisan, but rather an effect that occurs as a result of the process itself. Since the process disclosed by Appellant teaches no step not taught by the combination of Yasushi and Bensahel et al., the examiner does not see how the process steps taught by Yasushi and Bensahel et al. together will not yield the same result as the process steps taught by Appellant. In fact, the working example on p. 12 of Appellant's specification does not even include details such as processing temperature or duration of oxidation. It is not at all clear from this example which feature or combination of features of the process yields the result of distancing the nitrided oxide layer from the semiconductor substrate.

B.

Regarding dependent claims 2 and 13-16, Appellant argues that Wolf does not teach the elements lacking in the combined teachings of Yasushi and Bensahel et al. as applied to independent claim 1, so the rejection of these claims made under 35 U.S.C. 103(a) are improper.

Since, as discussed above, the examiner believes that no elements are lacking in the combined teachings of Yasushi and Bensahel et al. as applied to claim 1, this argument is not persuasive.

C.

Regarding independent claim 19, which is similar to claim 1, but adds the use of a computerized process monitoring for real-time statistical process control, Appellant argues that Li does not teach the elements lacking in the combined teachings of Yasushi and Bensahel et al. as described above relative to claim 1.

Since, as discussed above, the examiner believes that no elements are lacking in the combined teachings of Yasushi and Bensahel et al. as applied to claim 1, this argument is not persuasive.

D.

Finally, regarding claim 23, which depends from claim 19, Appellant argues that the examiner has not made a proper case of *prima facie* obviousness against claim 19, so the rejection of claim 23 should be reversed as well.

As addressed above, the examiner believes she has made a proper case of *prima facie* obviousness against claim 19, so this argument is not persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Heather Doty

Heather Doty

Conferees:

HD

Heather Doty, David Blum, Steven Loke